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EXAMINER	
HON, SOW FUN	

ART UNIT	PAPER NUMBER
1772	

MAIL DATE	DELIVERY MODE
09/10/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/542,017	TAKEDA ET AL.	
	Examiner	Art Unit	
	Sow-Fun Hon	1772	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *7/06/07*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-4 and 6-25* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-4,6-12 and 24* is/are rejected.

7)☒ Claim(s) *13-23, 25* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *6/7/07*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 6/07/07 has been entered.

Response to Amendment

Withdrawn Rejections

2. The 35 U.S.C. 102(b) and 103(a) rejections of claims 1-4, 7-25 over Verrall as the primary reference, are withdrawn due to Applicant's amendment dated 06/07/07.

New Rejections

Claim Objections

3. Claim 10 is objected to because of the following informalities: the term "linearly" should be rewritten as "linear" to conform to the language in parent claim 8. Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 1-4, 6-19 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

a. Independent claim 1 recites a stilbene that is not a derivative of stilbene, and an azobenzene that is not a derivative of azobenzene. It is unclear if substitution of the hydrogens by heteroatoms such as halogens, qualifies as derivatization. Clarification is requested. For the purposes of examination, derivatization includes hydrogen substitution.

b. Claim 13 recites at least two layers of a reflection polarizer (a) having respective selective reflection wavelength bands of polarized light superimposed on each other, wherein the reflection polarizer is the circularly polarizing plate comprising the broadband cholesteric liquid crystal film comprising: a cholesteric liquid crystal film having a reflection bandwidth of 200 nm or more, obtained by coating a liquid crystal mixture containing a polymerizable mesogen compound (a), a polymerizable chiral agent (b) and a photoisomerizable material (c) on a substrate and polymerizing by ultraviolet radiation, wherein the photoisomerizable material (c) is at least one photoisomerizable material selected from the group consisting of stilbene that is not a

derivative of stilbene, and azobenzene that is not a derivative of azobenzene. While it is clear from the specification (page 35, lines 14-23 and page 50, lines 5-10) that each of the two "layers" refer to a respective broadband cholesteric liquid crystal film obtained using the method described above, wherein the respective selective reflection wavelength bands of polarized light are superimposed on each other, the present claim language is not as clear. Correction is requested.

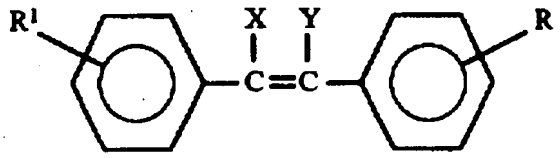
Claim Rejections - 35 USC § 102

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

5. Claims 1, 3-4, 6-7 are rejected under 35 U.S.C. 102(b) as being anticipated by Hikmet (US 5,798,057).

Regarding claim 1, for the purposes of examination, a stilbene that is not a derivative of stilbene is treated as a stilbene where not even the hydrogens are substituted. Hikmet teaches a broadband cholesteric (filter, abstract) liquid crystal film comprising: a cholesteric liquid crystal film obtained by coating a liquid crystal mixture on a substrate and polymerizing by ultraviolet radiation (a mixture of polymerizable liquid-crystalline molecules is provided between two substrates, and polymerized with UV light to form an optically active layer of cholesteric order, abstract), wherein the cholesteric liquid crystal film has a reflection bandwidth of 200 nm or more (and more, abstract). Hikmet teaches that the liquid crystal mixture contains a polymerizable mesogen compound (a) (monomers having at least two polymerizable groups also

include a liquid crystalline group, column 8, lines 57-59, diacrylate C6M (formula 3), column 7, lines 35-40), a polymerizable chiral agent (b) (liquid crystalline monomers having one polymerizable group, column 8, lines 54-55, monoacrylate formula 4, column 7, lines 40-41, which is chiral, column 6, lines 49-50) and a photoisomerizable material (c) (photo-stabilizing compound whose composition corresponds to the formula shown below, column 8, lines 37-45), which is stilbene when X = Y = R^1 = R = H (column 8, lines 40-50).



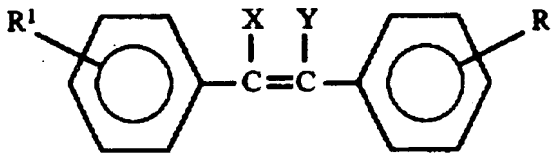
Although Hikmet fails to disclose that the compound shown above is photoisomerizable, this property is inherent in the compound due to the –CH=CH- photoisomerizable group. Furthermore, Hikmet does teach that the compound is used to provide a large increase in the bandwidth of the cholesteric liquid crystal filter (column 4, lines 8-10).

Regarding claim 3, Hikmet teaches that the liquid crystal mixture further comprises a photopolymerization initiator (d).

Regarding claim 4, Hikmet teaches that the polymerizable mesogen (a) has two or more polymerizable functional groups (at least two, column 8, lines 57-59), and the polymerizable chiral agent (b) has one polymerizable group (liquid crystalline monomers having one polymerizable group, column 8, lines 54-55, monoacrylate formula 4, column 7, lines 40-41, which is chiral, column 6, lines 49-50).

Regarding claim 6, for the purposes of examination, a stilbene that is not a derivative of stilbene is treated as a stilbene where not even the hydrogens are substituted. Hikmet teaches a manufacturing method for the broadband cholesteric liquid crystal film (filter, optically active layer of cholesteric order, abstract) described above. Although Hikmet fails to specify the step of coating, Hikmet teaches the step of providing a liquid crystal mixture between two substrates and the step of ultraviolet polymerizing thereof (a mixture of polymerizable liquid-crystalline molecules is provided between two substrates, and polymerized with UV light to form an optically active layer of cholesteric order, abstract), wherein the step of providing a liquid crystal mixture between two substrates results in the coating of at least one of the two substrates, and therefore inherently contains the step of coating the liquid crystal mixture on a substrate.

Hikmet teaches that the liquid crystal mixture contains a polymerizable mesogen compound (a) (monomers having at least two polymerizable groups also include a liquid crystalline group, column 8, lines 57-59, diacrylate C6M (formula 3), column 7, lines 35-40), a polymerizable chiral agent (b) (liquid crystalline monomers having one polymerizable group, column 8, lines 54-55, monoacrylate formula 4, column 7, lines 40-41, which is chiral, column 6, lines 49-50) and a photoisomerizable material (c) (photo-stabilizing compound whose composition corresponds to the formula shown on the next page, column 8, lines 37-45), which is stilbene when X = Y = R^1 = R = H (column 8, lines 40-50).



Although Hikmet fails to disclose that the compound shown above is photoisomerizable, this property is inherent in the compound due to the –CH=CH- photoisomerizable group. Furthermore, Hikmet does teach that the compound is used to provide a large increase in the bandwidth of the cholesteric liquid crystal filter (column 4, lines 8-10).

Regarding claim 7, Hikmet teaches a circularly polarizing plate comprising the broadband cholesteric liquid crystal film described above (circular polarizer, column 5, lines 47-50).

Claim Rejections - 35 USC § 103

6. Claims 2, 8-9, 11-12, 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hikmet as applied to claims 1, 3-4, 6-7 above, and further in view of by Verrall (US 6,099,758).

Hikmet teaches a broad band cholesteric liquid crystal film comprising: a cholesteric liquid crystal film having a reflection bandwidth of 200 nm or more, obtained by coating a liquid crystal mixture containing a polymerizable mesogen compound (a), a polymerizable chiral agent (b), a photoisomerizable material (c) on a substrate and polymerizing by ultraviolet radiation, wherein the photoisomerizable material (c) is stilbene and not a derivative thereof, as described above.

Regarding claim 2, Hikmet fails to teach that the pitch length in the cholesteric liquid crystal film changes continuously.

However, Verrall teaches a broadband cholesteric liquid crystal film (column 2, lines 1-5, film, column 1, lines 59-62) which has a reflection bandwidth of 200 nm or more (at least, column 4, lines 21-23) comprising: a liquid crystal film obtained by polymerizing a liquid crystal mixture containing a polymerizable mesogen compound (a) (abstract), a polymerizable chiral agent (b) (abstract) and a polymerizable photoisomerizable material (c) which is a derivative of stilbene (column 12, lines 25-31) when MG is selected of formula II of Verrall, shown below, wherein Z is –CH=CH- (column 12, lines 60-67), A^1 and A^2 are 1,4-phenylene (column 13, line 3) and m = 1.

$$—(A^1—Z)_m—A^2— \qquad \text{II}$$

Verrall teaches that the liquid crystal mixture is coated on a substrate (abstract), wherein the liquid crystal mixture further comprises a photopolymerization initiator (d) and is polymerized (polymerization initiator, polymerized by exposure to actinic radiation, abstract, photoinitiator, column 27, lines 49-54) with ultraviolet light (column 27, lines 49-54). Verrall teaches that a pitch length in the cholesteric liquid crystal film changes continuously (increases from a smaller value at one edge of the film to a higher value at the opposite edge of the film, column 4, lines 27-32).

In short, Verrall demonstrates that a cholesteric liquid crystal film, when formed by polymerizing with ultraviolet light a liquid crystal mixture coated on a substrate, wherein the liquid crystal mixture contains a polymerizable mesogen compound (a)

(abstract), a polymerizable chiral agent (b) (abstract) and a polymerizable photoisomerizable material (c) which contains a stilbene group, can be given a pitch length that changes continuously as discussed above, for the purpose of providing an asymmetrical pitch gradient and broader bandwidth (column 5, lines 54-59) to give improved brightness even at large viewing angles when used in a display (column 6, lines 4-8).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made, to have provided the broadband cholesteric liquid crystal film of Hikmet, which contains a stilbene group, with a pitch length that changes continuously, in order to provide an asymmetrical pitch gradient and broader bandwidth, to give improved brightness even at large viewing angles when used in a display, as taught by Verrall.

Regarding claims 8, 24, Hikmet teaches a circularly polarizing plate comprising the broadband cholesteric liquid crystal film described above (circular polarizer, column 5, lines 47-50), used in a luminaire in a display (column 5, lines 39-45, lines 46-53). Hikmet fails to teach that the circularly polarizing plate is part of a linear polarizer, and that a λ/4 plate is laminated on the circularly polarizing plate, let alone a luminaire comprising the linear polarizer on a front surface side of a surface light source having a reflective layer on the back surface side thereof.

However, Verrall teaches a circularly polarizing plate comprising the broadband cholesteric liquid crystal film (the light incident on the reflective polarizer is transformed into circularly polarized light, column 9, lines 65-67), wherein a linear polarizer (create

linearly polarized light, column 8, line 54) comprises the circularly polarizing plate and a λ/4 plate (converts circular polarized light to linear polarized light, column 8, lines 60-63) laminated on the circularly polarizing plate (laminating QWF and the reflective polarizer together, column 9, line 5). Verrall teaches a luminaire (illumination, column 10, lines 8-15) comprising the circularly polarizing plate (inventive reflective polarizer 14, column 10, lines 51-52, Fig. 1), which is part of the linear polarizer (reflected light redirected onto the reflective polarizer 14, converted by QWF 15 and compensation film 16 into linear polarized light, column 10, lines 63-66, Fig. 1) on a front surface side of a surface light source having a reflective layer on the back surface side thereof (backlight unit 11 with a lamp 12 and a combined light guide and reflector 13, column 10, lines 50-52, Fig. 1). Verrall teaches that the circularly polarizing plate thus used, provides a display with improved brightness gain (broadband reflective polarizer, column 11, lines 4-9).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made, to have laminated a λ/4 plate on the circularly polarizing plate of Hikmet, to form a linear polarizer, and to have provided a display with a luminaire comprising the linear polarizer on a front surface side of a surface light source having a reflective layer on the back surface side thereof, in order to provide the display with improved brightness gain, as taught by Verrall.

Regarding claim 9, Hikmet teaches a circularly polarizing plate comprising the broadband cholesteric liquid crystal film described above (circular polarizer, column 5, lines 47-50) used in a display (column 5, lines 39-45, lines 46-53). Hikmet fails to teach that the circularly polarizing plate is part of a linear polarizer, wherein the circularly

polarizing plate is laminated on a λ/4 plate so that a pitch length in the broadband cholesteric liquid crystal film is narrowed toward the λ/4 plate continuously.

However, Verrall teaches a circularly polarizing plate comprising the broadband cholesteric liquid crystal film (the light incident on the reflective polarizer is transformed into circularly polarized light, column 9, lines 65-67), wherein a linear polarizer (create linearly polarized light, column 8, line 54) comprises the circularly polarizing plate and a λ/4 plate (converts circular polarized light to linear polarized light, column 8, lines 60-63) laminated on the circularly polarizing plate (laminating QWF and the reflective polarizer together, column 9, line 5). Verrall teaches that the liquid crystal mixture that is used to form the broad band cholesteric liquid crystal film of the circularly polarizing plate (the light incident on the reflective polarizer is transformed into circularly polarized light, column 9, lines 65-67), is coated and cured directly on the λ/4 plate which serves as a substrate (column 9, lines 7-10), and that the substrate can function as a polymerization inhibitor, wherein the short pitch is on the side of the film towards the λ/4 plate substrate (with the smaller inhibiting effect if the other side of the film encounters a greater polymerization inhibitor, column 5, lines 45-53). Hence, Verrall teaches that the circularly polarizing plate comprising the broadband cholesteric liquid crystal film, can be laminated on the λ/4 plate so that a pitch length in the film is narrowed toward the λ/4 plate. Furthermore, Verrall teaches that the pitch length in the cholesteric liquid crystal film changes continuously (increases from a smaller value at one edge of the film to a higher value at the opposite edge of the film, column 4, lines 27-32). Thus, Verrall teaches that the circularly polarizing plate comprising the broadband cholesteric liquid

crystal film, can be laminated on the λ/4 plate so that a pitch length in the film is narrowed toward the λ/4 plate continuously. Verrall teaches that the asymmetrical pitch gradient and broader bandwidth of the circularly polarizing plate (column 5, lines 54-59) gives improved brightness even at large viewing angles when used in a display (column 6, lines 4-8).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made, to have laminated the circularly polarizing plate comprising the broadband cholesteric liquid crystal film of Hikmet on a λ/4 plate so that a pitch length in the film is narrowed toward the λ/4 plate continuously, to form a linear polarizer which provides a display with improved brightness even at large viewing angles, as taught by Verrall.

Regarding claims 11-12, Hikmet teaches a circularly polarizing plate comprising the broadband cholesteric liquid crystal film described above (circular polarizer, column 5, lines 47-50) used in a luminaire in a liquid crystal display (column 5, lines 39-45, passive or active matrix displays, lines 46-53). Hikmet fails to teach a luminaire comprising the circularly polarizing plate on a front surface side of a surface light source having a reflective layer on the back surface side thereof, let alone a liquid crystal display comprising a liquid crystal cell in a light emitting side of the luminaire.

However, Verrall teaches a luminaire (illumination, column 10, lines 8-15) comprising the circularly polarizing plate (inventive reflective polarizer 14, column 10, lines 51-52, Fig. 1), which is part of a linear polarizer (reflected light redirected onto the reflective polarizer 14, converted by QWF 15 and compensation film 16 into linear

polarized light, column 10, lines 63-66, Fig. 1) on a front surface side of a surface light source having a reflective layer on the back surface side thereof (backlight unit 11 with a lamp 12 and a combined light guide and reflector 13, column 10, lines 50-52, Fig. 1); and a liquid crystal display (device 10, column 10, lines 49-50, Fig. 1) comprising a liquid crystal cell (18, column 10, lines 55-56, Fig. 1) on a light emitting side of the luminaire (viewer 20, column 11, line 3); in Fig. 1 shown below.

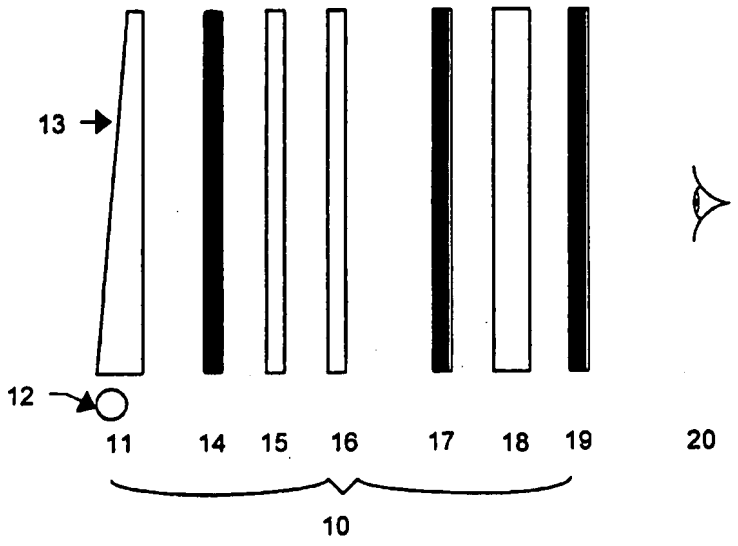


FIG. 1

Verrall teaches that the circularly polarizing plate thus used provides the liquid crystal display with improved brightness gain (broadband reflective polarizer, column 11, lines 4-9).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made, to have provided a luminaire comprising the circularly

polarizing plate of Hikmet, on a front surface side of a surface light source having a reflective layer on the back surface side thereof, and a liquid crystal display comprising a liquid crystal display in a light emitting side of the luminaire, in order to provide the liquid crystal display with improved brightness gain, as taught by Verrall.

7. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hikmet in view of Verrall, as applied to claims 2, 8-9, 11-12, 24 above, and further in view of Cobb (US 6,515,785).

Hikmet in view of Verrall teaches the linear polarizer comprising the circularly polarizing plate comprising the broad band cholesteric liquid crystal film, and a λ/4 plate laminated on the reflecting circularly polarizing plate, as discussed above. Hikmet in view of Verrall fails to teach that the linear polarizer further comprises an absorption polarizer adhered to the linear polarizer let alone that a transmission axis direction of the absorption polarizer and a transmission axis of the linear polarizer are arranged in parallel with each other.

However, Cobb teaches an absorbing polarizer and a reflecting polarizer laminated together and aligned for highest transmission (column 12, lines 38-46), which is when the transmission axis of the absorption polarizer (802, column 17, lines 44-46) and the reflecting polarizer (801, column 17, lines 52-53) are arranged in parallel with each other (801 is rotated to an orientation in which its transmission axis is parallel to the transmission axis of 802, column 17, lines 59-62), for the purpose of providing enhanced contrast with the highest transmission (column 12, lines 30-45).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made, to have adhered an absorption polarizer to the reflecting linear polarizer of Hikmet in view of Verrall, wherein a transmission axis direction of the absorption polarizer and a transmission axis of the linear polarizer are arranged in parallel with each other, in order to provide enhanced contrast with the highest transmission, as taught by Cobb.

Allowable Subject Matter

8. Claims 13-23, 25 would be allowable if rewritten to overcome the rejections under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

Upon closer review, it is determined that the closest cited prior art of record, US 5,798,057 fails to fairly teach or suggest, even in view of US 6,099,758, US 6,573,963, US 6,088,079, US 6,961,106, US 5,518,783, US 6,175,400 and JP 06-082777, the combination of a polarizing element system comprising: a retardation layer (b) having a front face retardation (in the normal direction) of almost zero and a retardation of $\lambda/8$ or more relative to incident light incoming at an angle of 30 degrees or more inclined from the normal direction arranged between at least two layers of a reflection polarizer (a) having respective selective reflection wavelength bands of polarized light superimposed on each other, wherein the reflection polarizer (a) is a circularly polarizing plate comprising the at least two layers, said at least two layers are each a broad band liquid crystal film having a reflection bandwidth of 200 nm or more, obtained by coating a

liquid crystal mixture containing a polymerizable mesogen compound (a), a polymerizable chiral agent (b) and a photoisomerizable material (c) on a substrate and polymerizing by ultraviolet radiation, wherein the photoisomerizable material (c) is at least one photoisomerizable material selected from the group consisting of stilbene that is not a derivative of stilbene, and azobenzene that is not a derivative of azobenzene, where derivatization includes hydrogen substitution.

There is no motivation to combine US 5,798,057 in view of US 6,099,758, with US 6,573,963, to arrange a retardation layer (b) having a front face retardation (in the normal direction) of almost zero and a retardation of λ/8 or more relative to incident light incoming at an angle of 30 degrees or more inclined from the normal direction, between at least two layers of a reflection polarizer (a), having respective selective reflection wavelength bands of polarized light superimposed on each other, wherein each layer is a cholesteric liquid crystal film having a reflection bandwidth of 200 nm or more, obtained by coating a liquid crystal mixture containing a polymerizable mesogen compound (a), a polymerizable chiral agent (b) and a photoisomerizable material (c) on a substrate and polymerizing by ultraviolet radiation, wherein the photoisomerizable material (c) is at least one photoisomerizable material selected from the group consisting of stilbene that is not a derivative of stilbene, and azobenzene that is not a derivative of azobenzene, where derivatization includes hydrogen substitution.

Response to Arguments

9. Applicant's arguments have been considered but are moot in view of the new ground(s) of rejection. See Applicant's remarks regarding the amendment filed 06/07/07.

Any inquiry concerning this communication should be directed to Sow-Fun Hon whose telephone number (571)272-1492. The examiner can normally be reached Monday to Friday from 10:00 AM to 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Rena Dye, can be reached on (571)272-3186. The fax phone number for the organization where this application or proceeding is assigned is (571)273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

S. Hon

Sow-Fun Hon

08/30/07